The Industrial Base Front and Center

The Impact of Globalization on Systems and Subsystems

April 29, 2003

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The Industrial Base Front and Center
The Impact of Globalization

- Go-global drives started 20 years ago
- Now the biggest trends shaping the economy is the globalization of knowledge work
  - 3.3 million white collar jobs and $136 billion in wages will move from the U.S. to low-cost countries by 2015.
  - 40% of America's top 1,000 companies will have an overseas pilot project underway in less than two years.
  - IBM, HP, Nortel, Intel, Microsoft and 5,296 other multinational corporations have facilities in the Pudong Region of China.
    - Microsoft conducts much of its research in China and software development in India
  - Half of the world's notebooks and one-third of its desktops are produced in Taiwan.

Sources:
•BusinessWeek
• Morgan Stanley
•ATIP
•CNET
•IMF
•Personal Interviews

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- **Why it's moving**
  - Financial performance pressures forcing cost savings through multiple vehicles one of which is moving manufacturing, basic research, chip design software development, IT support offshore.
  - Global capital flows and capital availability
  - An aggressive public-private effort to court foreign investment through:
    - Subsidized R&D
    - Low Interest - No Interest loans
    - Tax breaks
    - Low wages and large well educated labor pools
      - Aerospace Engineer: $650/mo with a masters - Russia
      - Chip Designer: $1,000/mo with Maters and 5 yrs exp. - India
      - Financial Analyst - $1,000/mo - India
      - Info-Tech Support - database manager - $500/mo - India

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- **What is moving:**
  - IT application development
  - IT support - call centers
  - Microprocessor design
  - Consumer electronics development and manufacturing
  - Hardware - computers, pdas, cell phones, audio products, displays, etc.
  - Software - digital ink, other applications
  - Financial Analysis - audit, tax preparation, “number crunching”
  - Aerospace - manufacturing and some R&D

For security and practical reasons corporations will likely keep hi-end R&D close to home

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REGION	TECHNOLOGY
	Semiconductors
China	Veeco Instruments (N.Y.) -mfg. Of metrology and process equipment for the semiconductor and data storage markets - established a nanotechnology center in Beijing.
China	Taiwan Semiconductor Manufacturing Co. - the world's largest chip foundry
China	Intel - Pentium 4's, chipsets and flash memory are assembled in China for worldwide consumption
India	Intel - Chip design
Taiwan	Via Technologies - Intel-compatible chipsets
Taiwan	companies
	Hardware
China	Lite-On - second largest optical driver manufacturer worldwide
China	Dell Computer - shifted its manufacturing from Japan to China
Japan	Embedded High Performance Computing (GRAPE, MDM-GRAPE, CP-PACS, Protein Explorer, etc.)
China	Microsoft Xbox - built in China
Taiwan	Via Technologies - new motherboard that consumes 10% less power and 50% less system noise - distributes processing needs to different components.
China	Philips - consumer electronics R&D
	Software
China	Microsoft - IP behind the MPEG-4 video streaming standard
	Microsoft - digital ink for the tablet pc
India	Microsoft - Sotware design
India	Oracle - software design, customer support (and accounting)
Japan	Cryptrec Project "unconditional security" for e-Government applications
China and Russia	Intel - handwriting applications - software that lets a pc readily understand shapes and visual patterns - toolkits that detect scene changes or anomalies in compressed video.
China and Russia	Intel - Most compiler work
	MEMS
France	Intel Capital is one funding source for Colibrys which manufactures and supplies MEMs components for military, life science and telecom
Japan, Korea, China, Hong Kong and Singapore	Power generating MEMS devices
	Nanotechnology
China	Nano Surface Disposal - water and oil proof, prevent shrinkage and discoloration of silk, woolen and cotton textiles; improves the textiles ability to absorb water of synthetic material. Future efforts: materials that will sense changes in light, sound,
	Manufacturing
Singapore and Other Asia	Flextronics - provides offshore manufacturing for Cisco, HP, Microsoft, Noki, Nortel, Lucent, Sony and others

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What it Means:

- This is not a “bad” thing but rather the result of a global “free” market economy.
- The systems and sub-systems developed to provide the information advantage within size, power, weight and logistic considerations will have hardware and software developed and manufactured off-shore.
  - Why ?
    - Availability
    - Cost of acquisition
    - Performance

What You Can Do:

- **Build your requirements around it**
  - Identify those critical applications that require software and hardware that must be developed in the U.S.
  - Don’t waste $$$ developing applications that provide baseline functionality.
- **Leverage it**
  - Capitalize on the resources available in the U.S. that provide the critical value add - make both work for you.
- **Manage it**
  - Currency of information on both markets and technology is critical to program success

Back Up


QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

Source: IMF

Globalization Trends

Number of Natural-Science
And
Engineering Graduates

	BA's 1989	BA's 1999	MA's and PhD's 1989	MA's and PhD's 1999
China	127,000	322,000	19,000	41,000
India	165,000	251,000	64,000	63,000
Philippines	40,000	66,000	255	937
Mexico	32,000	57,000	340	63,000
U.S.	196,000	220,000	61,000	77,000

Sample Western Companies

Accenture	2,000 in the Philippines by 2004	Accounting, software, back-office work
Conesco	1,700 in India, 3 more centers planned	Insurance claim processing
Delta Airlines	600 contract workers in India, Philippines	Airline reservations, customer service
Fluor	700 in the Philippines	Architectural blueprints
General Electric	29,000 in India alone by year end; large China R&D center	Finance, IT support, R&D for medical, lighting, aircraft

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Globalization Trends

	2005	2010	2015
Life Sciences	3,700	14,000	37,000
Legal	14,000	35,000	75,000
Art, Design	6,000	14,000	30,000
Management	37,000	118,000	288,000
Business Operations	61,000	162,000	348,000
Computer	109,000	277,000	473,000
Architecture	32,000	83,000	184,000
Sales	29,000	97,000	227,000
Office Support	295,000	791,000	1,700,000
TOTAL	588,000	1,591,000	3,300,000

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